CLAIMS

What is claimed is:

1. A fluid filtering device comprising:
   a) a centrifuge;
   b) a plurality of filtering wells within a plate placed in the centrifuge, wherein each filtering well includes a membrane for filtering a fluid; and
   c) an angling mechanism, wherein the angling mechanism can adjust the angle of the plate to a non 90° angle relative to a line wherein the line is perpendicular to the axis of rotation of the centrifuge and passes through the center of a major plane of the plate.

2. The device of Claim 1 wherein the angling mechanism includes a support device which can hold the membrane for filtering a fluid at an angle relative to the line.

3. The device of Claim 2 wherein the angling mechanism includes a wedge.

4. The device of Claim 1 wherein the angling mechanism is placed between the center of rotation of the centrifuge and the base of a swinging bucket.

5. The device of Claim 1 wherein the angling mechanism adjusts the top-to-bottom orientation of the membrane relative to the line.

6. The device of Claim 1 wherein the angling mechanism adjusts the side-to-side orientation of the membrane relative to the line.

7. The device of Claim 1 wherein the angling mechanism adjusts the side-to-side orientation and the top-to-bottom orientation of the membrane relative to the line.

8. The device of Claim 1 wherein the filtering wells are located in an array in the same plane.

9. The device of Claim 1 wherein each of the plurality of wells includes the angling mechanism.

10. The device of Claim 9 wherein each angling mechanism in each well includes an individually specified angle relative to the line.

11. The device of Claim 1 wherein the plane of the membranes are at a non 90° angle relative to the line.

12. The device of Claim 1 wherein the membrane includes a microfiltration membrane.

13. The device of Claim 1 wherein the membrane includes an ultrafiltration membrane.

14. The device of Claim 1 wherein said wells are arranged in rows and columns.

15. The device of Claim 14 wherein the angles of the membranes within a row are substantially the same.

16. A centrifuge comprising:

a) a housing;

b) a rotating mechanism attached to a center of rotation within the housing, wherein the rotating mechanism includes a swinging bucket; and

c) a fluid filtering device including a tray, a plurality of wells in said tray wherein said wells include a membrane and an angling mechanism, wherein the fluid filtering device is placed in the rotating mechanism and wherein the angling mechanism includes a support device which holds the membrane at a non 90° angle relative to a line wherein the line is perpendicular to the axis of rotation of the centrifuge and passes through the center of a major plane of the plate.

17. The centrifuge of Claim 16 wherein angling mechanism sets the membranes at a non 90° angle relative to the line.

18. The centrifuge of Claim 16 wherein the angling mechanism includes a wedge.

19. The centrifuge of Claim 18 wherein the angling mechanism has an angle between 2° and 30°.

20. The centrifuge of Claim 16 wherein the angling mechanism is placed between the center of rotation of the centrifuge and the base of the swinging bucket.

21. The centrifuge of Claim 16 wherein the angling mechanism can adjust the top-to-bottom orientation of the filtering device relative to the line.

22. The centrifuge of Claim 16 wherein the angling mechanism can adjust the side-to-side orientation of the filtering device relative to the line.

23. The centrifuge of Claim 16 wherein the angling mechanism adjusts the side-to-side orientation and the top-to-bottom orientation of the membrane relative to the line.

24. The centrifuge of Claim 16 wherein each of the plurality of wells includes the angling mechanism.

25. The centrifuge of Claim 24 wherein each angling mechanism in each well includes an individually specified angle relative to the line.

26. The centrifuge of Claim 16 wherein the swinging bucket includes a counterweight to maintain an angle of the swinging bucket relative to the line during a centrifugation of a fluid.

27. The centrifuge of Claim 16 wherein the centrifuge includes a stop to maintain an angle of the swinging bucket relative to the line during a centrifugation of a fluid.

28. The centrifuge of Claim 16 wherein the centrifuge includes a support assembly to hold the fluid filtering device at a fixed angle relative to the line.

29. A fluid filtering device comprising:

a) a centrifuge; and

b) a plurality of wells within a plate attached to the centrifuge, wherein each well includes a membrane for filtering a fluid, wherein the membranes are at a non 90° angle relative to a line of the centrifuge wherein the line is perpendicular to the axis of rotation of the centrifuge and passes through the center of a major plane of the plate.

30. The device of Claim 29 wherein the angle relative to the line includes a top-to-bottom orientation of the membrane.

31. The device of Claim 29 wherein the angle relative to the line includes a side-to-side orientation of the membrane.

32. The device of Claim 29 wherein the filtering wells are located in an array in the same plane.

33. The device of Claim 29 wherein each membrane in each well includes an individually specified angle relative to the line.

34. A method for filtering fluid comprising:

a) providing a filtration well plate having a plurality of wells wherein each well includes a membrane;

b) providing an angling mechanism to adjust the angle of the membrane of the filtering device to one or more non 90° angles relative to a line of a centrifuge wherein the line is perpendicular to the axis at rotation of the centrifuge and passes through the center of a major plane of the plate;

c) placing a fluid within the wells;

d) placing the fluid filtering device and angling mechanism within a centrifuge; and

e) centrifuging the fluid, thereby filtering the fluid through said membrane.

35. The method of Claim 34 wherein the membrane angle relative to the line is in the range of between about 88° and 60° degrees.

36. The method of Claim 34 wherein the fluid is filtered through a microfiltration membrane.

37. The method of Claim 34 wherein the fluid is filtered through an ultrafiltration membrane.

38. A fluid filtering device comprising:

a) a plurality of filtering wells within a plate wherein each filtering well includes a membrane for filtering a fluid; and

b) an angling mechanism, wherein the angling mechanism sets the angle of the membranes within the plurality of filtering wells at a non 90° angle relative to a line wherein the line is perpendicular to an axis of rotation of a centrifuge and passes through the center of a major plane of the plate.

39. The device of Claim 38 wherein the angling mechanism includes a support device which can hold the membrane for filtering a fluid at a non 90° angle relative to the line.

40. The device of Claim 39 wherein the angling mechanism includes a wedge.

41. A fluid filtering device comprising:

a) a plurality of wells within a plate wherein each well includes a membrane for filtering a fluid; and

b) an angling mechanism wherein the angling mechanism sets the angle of one or more of the membranes at a non-zero angle relative to the plane of the plate.

42. The device of Claim 41 wherein the angle relative to the plane of the plate includes a top-to-bottom orientation of the membrane.

43. The device of Claim 41 wherein the angle relative to the plane of the plate includes a side-to-side orientation of the membrane.

44. The device of Claim 41 wherein the filtering wells are located in an array in the same plane.

45. The device of Claim 41 wherein each membrane in each well includes an individually specified angle relative to the plane of plate.

46. A method for increasing average filtrate flow rate in a filtration well plate comprising:

a) providing a filtration well plate having a plurality of wells wherein each well includes a membrane;

b) placing fluid within the wells;

c) placing the filtration well plate in a centrifuge;

d) angling the filtration well plate at a non 90° angle relative to a line perpendicular to the axis of rotation of the centrifuge and passing through a center of a major plane of the plate to increase the fluid flow rate of the fluid through the membranes; and

e) centrifuging the fluid, thereby filtering the fluid through the membranes.

47. A method for increasing average filtrate flow rate in a filtration well plate comprising:

a) providing a filtration well plate having a plurality of wells wherein each well includes a membrane;

b) placing fluid within the wells;

c) placing the filtration well plate in a centrifuge;

d) angling the membranes at a non 90° angle relative to a line perpendicular to the axis of rotation of the centrifuge and passing through a center of a

major plane of the plate to increase the fluid flow rate of the fluid through the membranes; and

e) centrifuging the fluid, thereby filtering the fluid through the membranes.

48. A method for creating a uniform filtrate volume among a plurality of wells to a filtration well plate comprising:

a) providing a filtration well plate having a plurality of wells wherein each well contains a membrane;

b) placing fluid within the wells;

c) placing the fluid filtering device in a centrifuge;

d) angling the fluid filtering device at a non 90° angle relative to a line perpendicular to the axis of rotation of the centrifuge and passing through a center of a major plane of the plate to create a uniform filtrate volume of the fluid filtered through the membranes; and

e) centrifuging the fluid, thereby filtering the fluids through the membrane.

49. A method for creating a uniform filtrate volume among a plurality of wells of a filtration well plate comprising:

a) providing a filtration well plate having a plurality of wells wherein each well contains a membrane;

b) placing fluid within the wells;

c) placing the fluid filtering device in a centrifuge;

d) angling the membranes at a non 90° angle relative to a line perpendicular to the axis of rotation of the centrifuge and passing through a center of a major plane of the plate to create a uniform filtrate volume of the fluid filtered through the membranes; and

e) centrifuging the fluid, thereby filtering the fluids through the membrane.